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Description of six *Lepidosperma* species (Cyperaceae) based on type specimens

Russell L. Barrett

Botanic Gardens and Parks Authority, Kings Park and Botanic Garden,
West Perth, Western Australia 6005
School of Plant Biology, Faculty of Natural and Agricultural Sciences, The University of Western Australia,
Crawley, Western Australia 6009
Western Australian Herbarium, Department of Environment and Conservation,
Locked Bag 104, Bentley Delivery Centre, Western Australia 6983
Email: russell.barrett@bgpa.wa.gov.au

Abstract

Barrett, R.L. Description of six *Lepidosperma* species (Cyperaceae) based on type specimens. *Nuytsia* 22(5): 295–322 (2012). Many species of *Lepidosperma* Labill. have been poorly circumscribed, resulting in significant nomenclatural confusion. Full descriptions of six species based solely on type specimens held in the Webb Herbarium in Florence (FI-W) and the Preiss Herbarium in Lund (LD) are presented here in order to facilitate accurate application of the names involved. Descriptions are provided for *Lepidosperma costale* Nees, *L. gladiatum* Labill., *L. fimbriatum* Nees, *L. humile* (Nees) Boeck., *L. longitudinale* Labill. and *L. squamatum* Labill., as well as notes about these species.

Introduction

The genus *Lepidosperma* Labill. contains 73 currently named species (Barrett & Wilson 2012) with a large number of unnamed taxa remaining to be described. Determining the correct application of existing names is crucial before any new names are created so as not to increase nomenclatural confusion. Barrett and Wilson (2012) have recently examined all relevant type specimens and chosen lectotypes as required, resolving a great deal of past confusion. There are, however, a number of names that still have some questions about their application or origin.

Collections of Labillardière

Jacques J.H. de Labillardière collected botanical specimens from south-east Tasmania (Recherche Bay to the northern end of d'Entrecasteaux Channel) and Esperance Bay in Western Australia in 1792–3 while aboard the *Recherche* under Bruny d'Entrecasteaux, in search of Jean François de Galaup, comte de la Pérouse (Nelson 1974, 1975; Galloway 1988; Horner 1995; Duyker 2003; George 2009). He made the first collections of Australian *Lepidosperma* and named the genus based on these collections (Labillardière 1805). All of the *Lepidosperma* species named by Labillardière were stated to have been collected in Tasmania, but it is apparent that this was not necessarily correct, with the collection location of three species being in doubt. As currently circumscribed, two species named

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by Labillardière (*L. gladiatum* Labill. and *L. longitudinale* Labill.) occur in both Western Australia and Tasmania, while a third (*L. squamatum* Labill.) is restricted to Western Australia (first noted by Bentham in 1878).

Lepidosperma gladiatum is relatively uniform in its morphology across southern Australia and appears to be a well-defined taxon, so while the exact origin of the type collection is in doubt, the application of the name is not. A description is presented here in case small differences become apparent which will allow the origin of the type specimen to be determined.

Lepidosperma longitudinale presents a more complex problem. Its morphology is relatively similar across southern Australia and the presence of more than one entity under this name was not suspected until recent molecular data was obtained that demonstrated a clear divergence between western and eastern populations (Barrett 2012). *Lepidosperma exaltatum* R.Br. was named from the Sydney region based on populations with open, expanded inflorescences, but this feature appears to be variable across the range of *L. longitudinale s. lat.* and it is currently treated as one species. It is critical to determine whether the type of *L. longitudinale* was collected in Tasmania or Western Australia so that the application of the name *L. longitudinale* can be determined and a new name provided for the Western Australian populations if the type proves to be from Tasmania. If the type of *L. longitudinale* is shown to apply to Western Australian material, then both names can be applied.

Labillardière is known to have received specimens collected in various parts of southern Australia by Jean-Baptiste L.C.T. Leschenault de la Tour as botanist on the *Géographe* expedition of 1801–1803 under Nicholas-Thomas Baudin (Nelson 1974, 1975; Galloway 1988, specimens at FI-W and P). These collections and locations need to be considered when assessing type material utilised by Labillardière.

Collections of Preiss

The application of three *Lepidosperma* species names published by Nees (1846) has been in doubt for some time. The name *L. costale* Nees has been applied to a large number of distinct taxa in Western Australia. Even when restricted to the complex of species related to the type specimen, complex genetic processes, including polyploidy and hybridisation, make matching the type specimen as closely as possible to an extant population critical (Wallace *et al.* 2011; Barrett *et al.* 2012; Wallace *et al.* in prep.).

Two names, *L. fimbriatum* Nees and *L. humile* (Nees) Boeck. (originally published as *L. lineare* R.Br. var. *humile* Nees) were not taken up in Australia following publication, only recently being added to the formal census of Western Australian flora (Western Australian Herbarium 1998–). Both of these taxa have only relatively recently been recollected. Boeckeler (1874) was one of the few to study the original collections and note the distinctiveness of *L. lineare* var. *humile* from *L. lineare*, raising it to specific rank. These specimens were stated to have been collected 'in the interior of Western Australia'. The descriptions were inadequate to accurately apply the names to particular taxa without examination of the type specimens held at LD. The matter was further confused for *L. fimbriatum* as a specimen at G with the same *Plantae Preissianae* number as the type belongs to a different taxon, leading this name to be synonymised under *L. angustatum* R.Br. (Govaerts *et al.* 2007). It remains uncertain whether Johan August Ludwig Preiss received material of these two species (and others bearing similar collection localities) from other collectors, or whether they were collected at the most distant point of his explorations inland from Cape Riche and were without any direct point of reference. Further discussion of Preiss collections can be found in Barrett and Wilson (2012).

Methods

Specimens were examined at the host institutions (FI-W and LD) using light microscopy. Measurements of specimens were made following the methods described in Barrett (2007). One unusual term is repeated here. The angle of the spread of an individual ramet (fan) of growth is given as it indicates the growth habit of the plant. This can be quite useful to distinguish some taxa with distichous leaves. Descriptions are based on the type specimens only, but selected modern specimens are cited to indicate the range of each species as currently understood. Notes are given on the distribution, habitat, phenology, conservation status and other aspects of these species.

Lepidosperma type specimens at FI-W

Lepidosperma gladiatum Labill., *Nov. Holl. Pl.* 1(2–4): 15, t. 12 (1805) (as *gladiata*). *Type citation*: 'In capite Van-Diemen.' *Lectotype, fide* R.L. Barrett & K.L. Wilson, *Austral. Syst. Bot.* 25: 255 (2012): 'Nova Hollandia et Terra Diemen' [? added by Webb] [Western Australia or Tasmania, 1792–1793, *J.J.H. de Labillardière s.n.*] (*lectotype*: FI-W 191246, photo BRI AQ0477941, K, NSW; *isolectotypes*: BRI AQ0341347 (fragment ex FI-W), FI-W 191247 (photo BRI AQ0477941, K, NSW), FI-W 191248 (photo BRI AQ0477941, K, NSW), G (2 sheets); P 00603276, P 00603277, TCD (image seen)).

This description is based on the lectotype and isolectotype sheets at FI-W only.

Tufted perennial. *Culms* and *leaves* distichous; leaf to culm length ratio 0.8–1.1:1; angle of fan (ramet) spread *c.* 14° (inner section only). *Leaves* rigid, equitant, erect, flat, finely striate, green, not glaucous, with 78–114 stomatal rows per face, 42–75 cm tall, 6.9–9.2 mm wide, 0.47–1.36 mm thick; margins cream, smooth, not resinous, with occasional small scabrid projections; sheath dark brown, glabrous, the base entire, without resin. *Culms* as for leaves but with a thickened midrib, with 100–134 stomatal rows per face, 53+ cm tall [base cut off], 7.2–9.4 mm wide, 1.51–2.20 mm thick; margins as for leaves, pale. *Inflorescence* compact-obovate in outline, 90+ mm long, 35–50 mm wide, with several short branches, one lateral branch per node; basal lateral branch 25–35 mm long with 43–80 spikelets; involucral bract 35–50 mm long. *Spikelets* 6.4–8.8 mm long, the upper flower bisexual, the lower flower functionally male. *Glumes* 6, weakly keeled, mid-brown with narrow pale margins, the exposed surface evenly covered with short, appressed to ascending white hairs (glabrous below), the apex acute to acuminate; sterile glumes 4; fertile glumes 5.2–7.3 mm long, 2.4–2.8 mm wide. *Hypogynous scales* 6, falling with the nut, broadly triangular, white, 1.45–1.93 mm long; apex acuminate, with hairs. *Stamens* 3; anthers 3.8–4.1 mm long including the apical appendage (*c.* 0.45 mm long), 0.48–0.56 mm wide; filaments 4.1–5.7 mm long. *Style* 3-fid, unbranched portion 3.7–4.1 mm long, branches 2.9+ mm long [tips broken off]; style base continuous with ovary, caducous; stylar cap small. *Nut* brown, smooth, not ribbed, obovate in outline, terete in section, 3.5–3.7 mm long, 1.6–1.9 mm wide; epidermal cells round to ovate in outline. (Figures 1–5)

Selected specimens examined. WESTERN AUSTRALIA: Bald Island, 16 Oct. 2003, *S.D. Hopper* 8583 (PERTH); Rottnest Island, lookout over Pocillopora Reef, 30 Dec. 1998, *J. Rippey* 002 (PERTH). SOUTH AUSTRALIA: Eyre Peninsula, 7.5 km WSW of Memory Cove on track back to main road, Lincoln National Park, 5 Dec. 1994, *K.L. Wilson* 9288 (AD, NSW). VICTORIA: Wilsons Promontory, site 4-57-6, 11 Mar. 1989, *E. Chesterfield* 2320 (MEL); TASMANIA: Arthur River settlement, 29 Dec. 2005, *J.J. Bruhl* 2377 (HO, NE, NSW); NEW SOUTH WALES. Snapper Point, *c.* 3 km S of Kioloa, 26 Apr. 1991, *K.L. Wilson* 7843 (NSW).

Figure 1. Lectotype of *Lepidosperma gladiatum* (*Labillardière s.n.*; FI-W 191246).

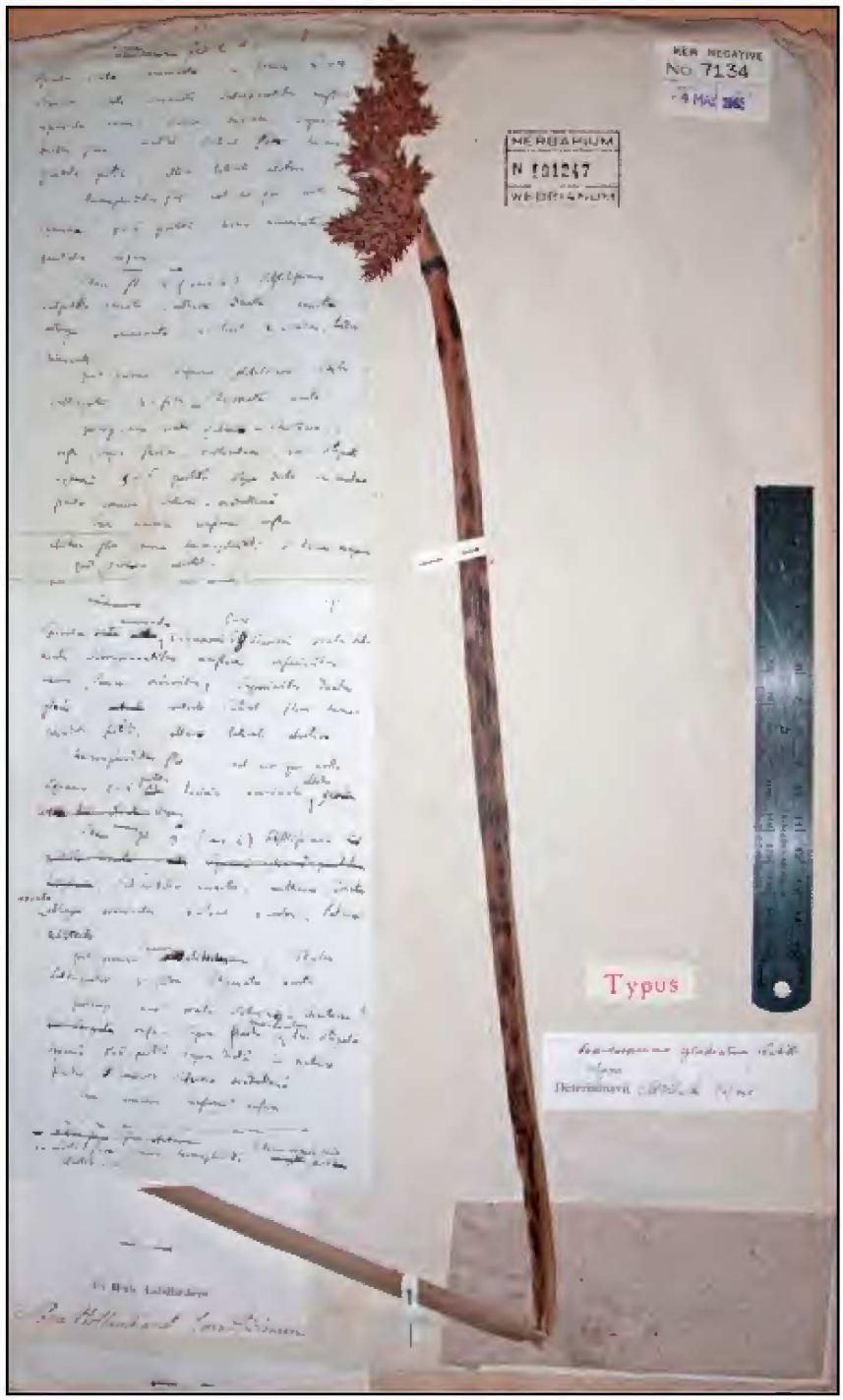

Figure 2. Isolectotype of *Lepidosperma gladiatum* (*Labillardière s.n.*; FI-W 191247).

Figure 3. Isolectotype of *Lepidosperma gladiatum* (*Labillardière s.n.*; FI-W 191248).

Figure 4. Isolectotype of *Lepidosperma gladiatum* (*Labillardière s.n.*; FI-W 191245).

Figure 5. Isolectotypes of *Lepidosperma gladiatum*. A – spikelets; B – leaf section; C – nut; D – spikelets and nut (*Labillardière s.n.*; A, C, D: FI-W 191247; B: FI-W 191248). Scale bars: A = 1 cm; B = 5 mm; C = 2 mm; D = 3 mm.

Distribution and habitat. Widespread along the southern coast of Australia with a disjunction across the Great Australian Bight (Figure 6A). *Lepidosperma gladiatum* is largely restricted to near-coastal sand and limestone dune systems, occasionally found up to five kilometres inland where coastal sands have been blown over other geological formations.

Phenology. Flowering mainly recorded for April and May with sporadic records from December and January following large rainfall events.

Conservation status. Widespread and not threatened.

Etymology. From the Latin *gladius* (sword), in reference to the leaf blades being sword-shaped, giving rise to the common name of Sword Sedge.

Notes. The name *L. gladiatum* has been consistently applied to a taxon occurring across southern Australia; the taxon is supported by recent molecular evidence (Barrett 2012). There are potentially two morphotypes, but they are both found across the range of the species and most likely only represent ecotypic variation. Labillardière (1805) listed the location of the collection as from Tasmania although it could have been collected in either Tasmania or Western Australia.

Lepidosperma longitudinale Labill., *Nov. Holl. Pl.* 1(2–4): 16, t. 13 (1805) (as *L. longitudinalis*). *Type citation*: 'In capite Van-Diemen.' *Type specimen*: 'Nova Hollandia et Terra Diemen' [annotation on holotype added by Webb?] [Tasmania or Western Australia, 1792–1793, *J.J.H. de Labillardière s.n.*] (*holotype*: FI-W 191254 (photo BRI AQ0477937, K, NSW); *isotypes*: BRI AQ0341353 (fragment ex FI-W), FI-W 191253, G (2 sheets), TCD (image seen)).

This description is based on the holotype and isotype sheets at FI-W only.

Tufted perennial. *Culms* and *leaves* distichous; leaf to culm length ratio 0.6–1:1; angle of fan (ramet) spread *c.* 20°. *Leaves* rigid, erect, biconvex, finely striate, green, paler at base, not glaucous, with 62–82 very densely arranged stomatal rows per face, 34–71 cm tall, 3.9–5.0 mm wide, 1.35–1.92 mm thick; margins pale, smooth, not resinous; sheath dark brown, glabrous, the base entire, without resin. Leaves with 4 longitudinal vascular bundles running through internal pith. *Culms* as for leaves but thicker, with 82–88 stomatal rows per face, 64–91 cm tall, 3.6–4.1 mm wide, 1.10–2.08 mm thick; margins as for leaves, pale. Internal pith without longitudinal vascular bundles. *Inflorescence* interrupted-linear in outline, 110–180 mm long, 13–27 mm wide, with several long branches, one lateral branch per node; basal lateral branch 60–65 mm long with 32–65 spikelets; involucral bract 37–53 mm long. *Spikelets* 4.8–7.0 mm long, the upper flower bisexual, the lower flower functionally male. *Glumes* 6, strongly keeled, pale brown with darker flecks and a narrow opaque margin, the surface glabrous, the apex apiculate to acuminate; sterile glumes 4; fertile glumes 4.9–6.1 mm long, *c.* 1.9 mm wide. *Stamens* 3; anthers 2.8–3.2 mm long including the apical appendage (*c.* 0.35 mm long), 0.40–0.42 mm wide; filaments 4.0–4.5 mm long. *Style* 3-fid, unbranched portion 3.1–3.3 mm long, branches 2.27–2.79 mm long; style base continuous with ovary, caducous. *Nut* not developed. (Figures 7–9)

Selected specimens examined. WESTERN AUSTRALIA: Brixton Street Wetland, Greater Perth, 7 Sep. 2007, *G.A. Verboom* 1251 (BOL, PERTH); SOUTH AUSTRALIA: Kangaroo Island, Gosse–Ritchie Rd, 4 km S of Playford Hwy, 28 Oct. 2005, *B.M. Overton* 2926 (AD). VICTORIA: 5.8 km W on Victoria Valley Rd from Grampians Tourist Rd, western base of Serra Range, *c.* 31 km SSW of Halls Gap, Grampians National Park, 05 Oct. 2008, *R.L. Barrett* RLB 5223 (PERTH; duplicates to be

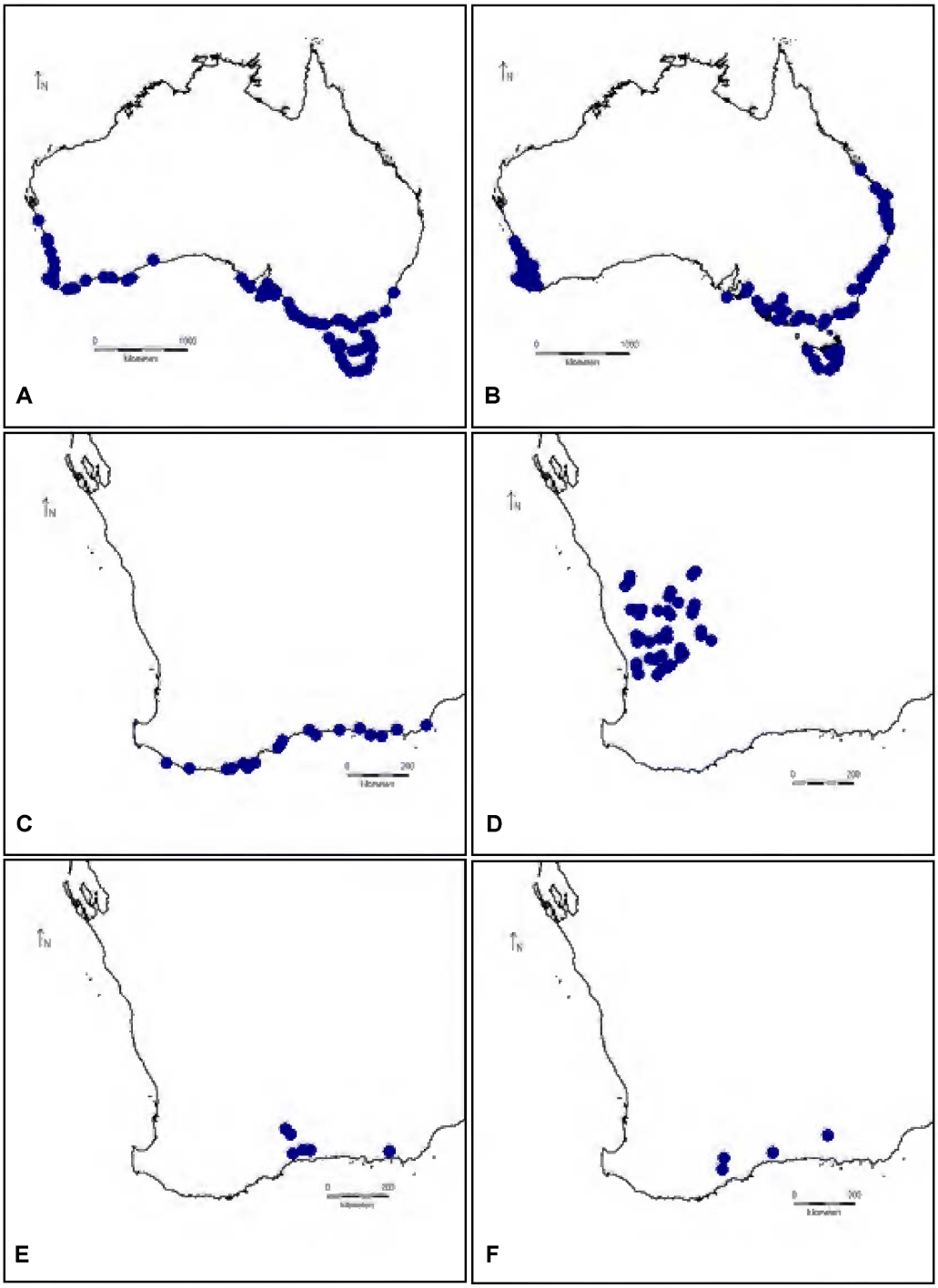

Figure 6. Distribution of *Lepidosperma* species. A – *L. gladiatum*; B – *L. longitudinale* (*s. lat.*); C – *L. squamatum* (*s. lat.*); D – *L. costale* (*s. lat.*); E – *L. fimbriatum*; F – *L. humile*. Maps derived from *Australia's Virtual Herbarium* data (Council of Heads of Australasian Herbaria 2009–).

Figure 7. Holotype of *Lepidosperma longitudinale* (*Labillardière s.n.*; FI-W 191254). Scale bar = 2 cm.

Figure 8. Isotype of *Lepidosperma longitudinale* (left hand element only) (*Labillardière s.n.*; FI-W 191253).

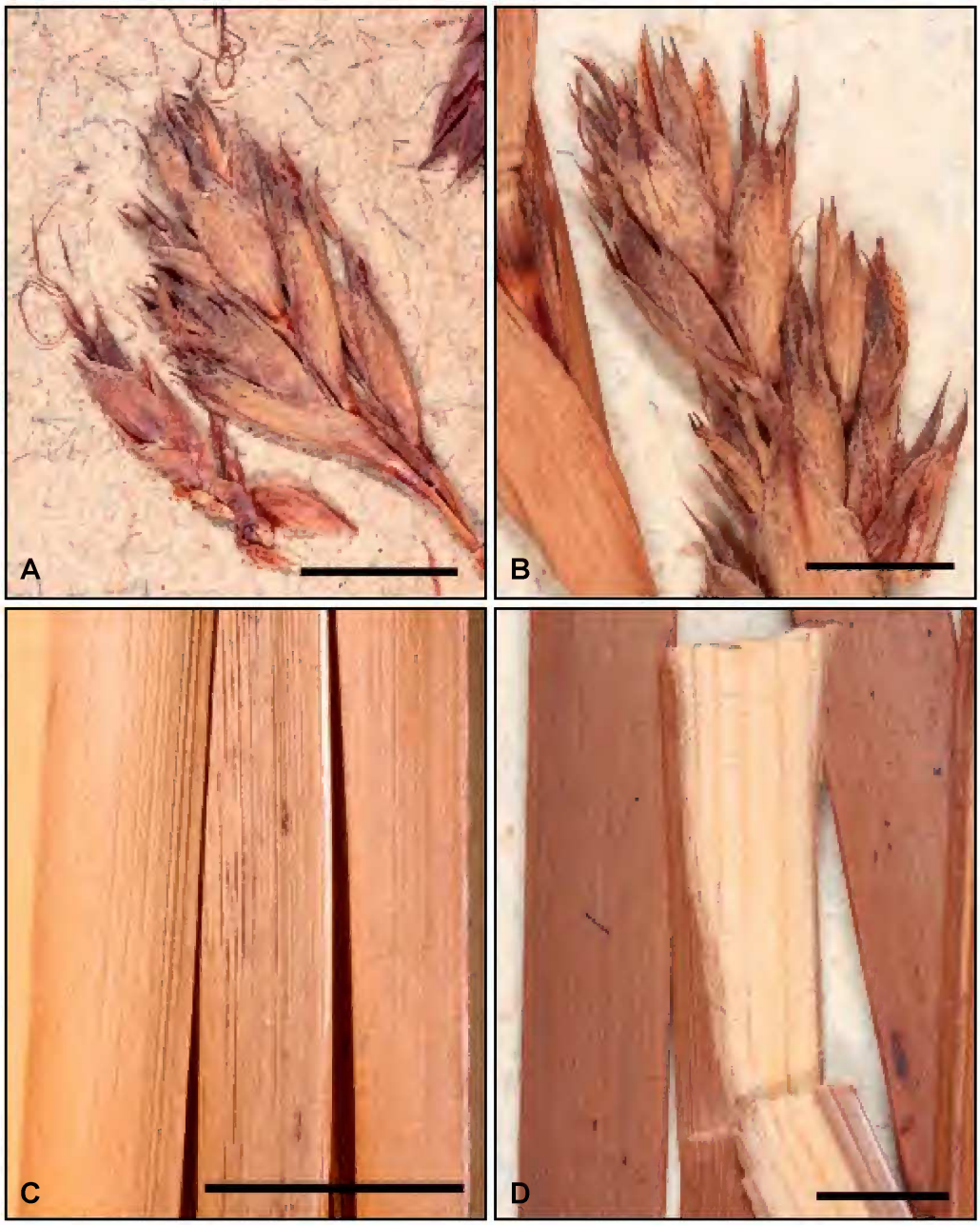

Figure 9. Holotype of *Lepidosperma longitudinale*. A, B – spikelets; C – leaf face; D – leaf (longitudinal section) (*Labillardière s.n.*; FI-W 191254). Scale bars: A, B, D = 5 mm; C = 1 cm.

distributed); *c.* 1.4 km E of Perry River, *c.* 19 km ENE of Stratford along Princes Hwy, Providence Ponds Flora and Fauna Reserve, Gippsland Plain, *K.L. Wilson & A. Wilson* KLW 10505, 1 Jan. 2009 (BOL *n.v.*, NSW, MO *n.v.*, PERTH). TASMANIA: South West, Second Lagoon, Melaleuca Inlet, opposite Charlies Hill, 2 Apr. 1992, *K.L. Wilson* 8416 (HO, NSW). NEW SOUTH WALES: Nelson Bay road, 5.2 km ENE of the Soldiers Point and Nelson Bay roads junction at Anna Bay, 10 Mar. 1993, *R.G. Coveny* 16464, *S.F. McCune & T.M. Tame* (NSW). QUEENSLAND: Moreton Island, *c.* 8 km SSW of Cape Moreton, 27 Mar. 1973, *L. Durrington* 183 (BRI, PERTH).

Distribution and habitat. As currently defined, widespread around the southern coast of Australia, growing in swampy habitats, either in coastal dune swales, or extending inland along major drainage lines, extending as far inland as the Grampians in Victoria. There is a major disjunction in the distribution between Albany in Western Australia and the southern Eyre Peninsula in South Australia (Figure 6b).

Phenology. Flowering recorded from March–June.

Conservation status. Widespread and not threatened.

Etymology. From the Latin *longitudinis* (long, longitudinal), probably in reference to the longitudinal internal supportive vascular bundles found in the leaves (but absent from the culms).

Notes. The name *L. longitudinale* has been consistently applied to a taxon occurring across southern Australia. Recent molecular evidence suggests divergence between the eastern and western populations such that recognition of two taxa is probably warranted (Barrett 2012). The origin of Labillardière's collection is of particular importance for the correct application of names. Labillardière (1805) listed the location of the collection as from Tasmania, although it may have been collected in either Tasmania or Western Australia. If the latter is the case, then Labillardière could not have collected the specimen as he only visited the Esperance area where this species is not found. Nelson (1974, 1975) did not discuss the probable collection locality of this species. It is hoped that with critical comparison of the morphology of *L. longitudinale s. lat.* across its range, the origin of the type collection can be determined with confidence.

The name *L. exaltatum* is available for eastern populations if the type of *L. longitudinale* is shown to be from Western Australia.

Lepidosperma squamatum Labill., *Nov. Holl. Pl.* 1(2–4): 17, t. 16 (1805) (as *squamata*). *Type citation*: 'in capite Van-Diemen.' *Lectotype, fide* R.L. Barrett & K.L. Wilson, *Austral. Syst. Bot.* 25: 279 (2012): 'Nova Hollandia et Terra Diemen' [?added by Webb] [Western Australia, ?*J.J.H. de Labillardière s.n.*] (*lectotype*: FI-W 191261 (photo BRI AQ0477936, K, NSW); *isolectotypes*: BRI AQ0341361 (fragments in two packets ex FI-W), FI-W 191260, MEL 2295914 (fragment), TCD (image seen)).

This description is based on the lectotype and isolectotype sheets at FI-W only.

Tufted perennial with adventitious rhizomes. Rhizome scales almost black at the base, grading to brown with an opaque margin, 7.8–9.0 mm long, *c.* 2.5 mm broad (curled), not entirely appressed to the rhizome, the apex acuminate, with multiple convergent ribs. *Culms* and *leaves* distichous; leaf to culm length ratio 0.6–1:1; angle of fan (ramet) spread 12–25°. *Leaves* equitant, rigid, erect, compressed biconvex, with fine ridges with 3–5 deeper grooves at intervals across the blade to give the appearance

of secondary ridges which are more prominent on smaller leaves, almost absent on broader leaves, dull green, not glaucous, with 12–34 stomatal rows per face, 10.5–23 cm tall, 1.13–2.89 mm wide, 0.42–0.73 mm thick; margins cream, almost smooth, not resinous, with small, short, thick white hairs scattered on margin, quickly becoming reduced to small scabrid projections/calluses which remain on mature leaves; sheath dark brown, glabrous, the base entire to slightly fibrous, without resin. *Culms* as for leaves but not so compressed, with 16–25 stomatal rows per face, 9–28 cm tall, 1.36–1.98 mm wide, 0.49–0.96 mm thick; margins as for leaves. *Inflorescence* compact, obovate to triangular in outline, 17–34 mm long, 12–22 mm wide, with few short branches, one lateral branch per node; basal lateral branch 9–26 mm long with 4–11 spikelets; involucral bract 10–21 mm long. *Spikelets* 5.76–7.26 mm long, the upper flower bisexual, the lower flower functionally male. *Glumes* 6, weakly keeled, dark brown with narrow, pale margins, the exposed surface evenly covered with short, appressed to ascending white hairs (glabrous below), the apex acuminate; sterile glumes 4; fertile glumes 4.9–6.1 mm long, 1.64–1.71 mm wide. *Hypogynous scales* 6, falling with the nut, broadly triangular, white, 1.02–1.35 mm long; apex acuminate, with a few short hairs. *Stamens* 3; anthers (immature) *c*. 2.6 mm long including the apical appendage, *c*. 0.22–0.30 mm wide; filaments not developed. *Style* 3-fid, (immature) unbranched portion 0.6+ mm long, branches 1.2+ mm long [tips broken off]; style base continuous with ovary, caducous; stylar cap small. *Nut* pale to dark brown, smooth, with 3 very obscure ribs towards the base, obovoid in outline, terete in section, 2.9–3.0 mm long, 1.58–1.69 mm wide; epidermal cells orbicular to ovate, occasionally oblong in outline. (Figures 10–12)

Selected specimen examined. WESTERN AUSTRALIA: Israelite Bay, 6 Nov. 1980, *K.R. Newbey* 7983 (PERTH).

Distribution and habitat. The type specimen belongs to a taxonomically challenging species complex that is relatively widespread on near-coastal dunes in south-west Western Australia (Figure 6c).

Phenology. Flowering recorded for May.

Conservation status. Widespread and not threatened.

Etymology. From the Latin *squama* (scale), apparently in reference to the hypogynous scales on the nut. This is the defining characteristic of the genus, and the scales are not unusual in this species. The holotype also has distinctive scale-like bracts on the adventitious rhizome, but these are not mentioned in the original description.

Notes. The name *L. squamatum* has had a long and confusing history of application, largely due to the fact that Labillardière (1805) listed the location of the collection as Tasmania when in reality it must have been collected in Western Australia. This conclusion was reached by Bentham (1878) and followed by Nelson (1974, 1975). The type collection appears to best match a morphotype from coastal dunes in southern Western Australia, although more detailed studies are required. The single specimen cited, from east of Esperance, is the closest match to the type specimen that has been located at PERTH so far. At times, the name has been applied to the morphologically similar *L. sieberi* Kunth from south-eastern Australia (Barrett & Wilson 2012).

Figure 10. Lectotype of *Lepidosperma squamatum* (*Labillardière s.n.*; FI-W 191261).

Figure 11. Isolectotype of *Lepidosperma squamatum* (*Labillardière s.n.*; FI-W 191260).

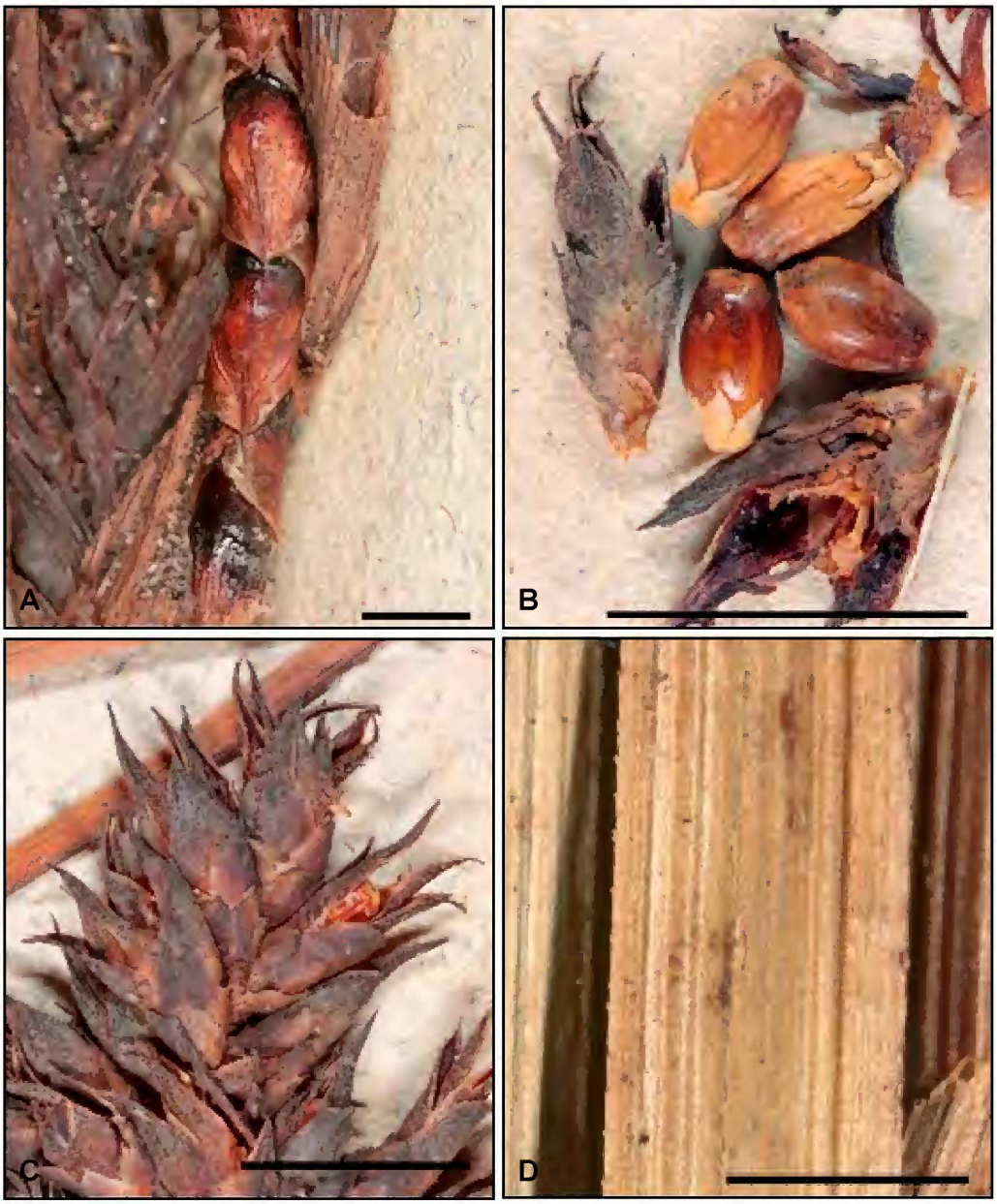

Figure 12. Lectotype of *Lepidosperma squamatum*. A – rhizome; B – spikelet and nuts; C – spikelets; D – leaf surface (*Labillardière s.n.*; FI-W 191261). Scale bars: A = 3 mm; B, C = 5 mm; D = 2 mm.

Lepidosperma type specimens at LD

Lepidosperma costale Nees, in Lehm., *Pl. Preiss.* 2(1): 92 (1846). *Type citation*: 'In solo sublimoso-arenoso planitiei prope praedium rusticum cl. Viveach, York, Apr. a. 1840. Herb. Preiss. No. 1798 – Forma morbosa, ustilagine ovarii correpta: in rupestribus haud procul a fonte St. Ronan's well, York, Apr. a. 1840. No. 1799.' *Lectotype*, *fide* R.L. Barrett & K.L. Wilson, *Austral. Syst. Bot.* 25: 245 (2012): In solo sublimoso-arenoso planitiei prope praedium rusticum cl. Viveach [In sunny elevated sandy plain near the country estate of Viveash, S of] York, [Western Australia], 17 Apr. 1840, *L. Preiss* [*Pl. Preissianae* No. 1798] (*lectotype*: LD; *isolectotypes*: BM 000901250, G, MEL 2288218, MEL 2288219 *p.p.*, NY 00051302, P 00603284).

This description is based on the lectotype sheet at LD only.

Tufted perennial with short rhizomes. *Culms* and *leaves* spirodistichous; leaf to culm length ratio 0.6–1.2:1; angle of fan (ramet) spread 10–14°. *Leaves* rigid, fully erect, angular, distinctly diamond-shaped in cross-section, scarcely finely striate, with *c.* 21–24 stomatal rows, 14.5–31.5 cm tall, 1.31–1.72 mm wide, 0.41–0.61 mm thick; margin pale green, young growth at least with a continuous band of fine, white, upturned hairs wearing to appear scabrous as they age, not resinous; sheath pale brown, glabrous, the base slightly fibrous to almost entire, not resinous. *Culms* as for leaves, scarcely finely striate, with 19–34 stomatal rows, 23–26 cm tall, 1.22–1.96 mm wide, 0.47–0.81 mm thick. *Inflorescence* loose-linear in outline, 32–53 mm long, 9.2–9.7 mm wide, with few, short, lateral branches, 1 branch per node; lateral branches small, in line with main axis (inflorescence appearing almost simple), 12–24 mm long with 7–11 spikelets; involucral bract 15.5–29 mm long. *Spikelets* 4.1–5.6 mm long, the upper flower bisexual, the lower flower functionally male. *Glumes* 6 with opaque pale margins grading to a rusty red keel, the surface with numerous minute, white hairs near the apex, the margins glabrous, the apex acute to acuminate; sterile glumes 4; fertile glumes *c.* 3.9 mm long, *c.* 1.5 mm wide. *Hypogynous scales* 6, falling with the nut, broadly triangular, white, *c.* 0.78 mm long; apex acuminate, with a few apical hairs. *Stamens* [anthers missing from specimen]; filaments *c.* 3.1 mm long, broadly dilated at the base. *Style* missing from specimen; style base continuous with ovary, caducous; stylar cap large. *Nut* cream, becoming mottled brown with age, smooth, with 3 moderate ribs, obovate in outline, terete in cross-section, *c.* 3.1 mm long, *c.* 1.0 mm wide; epidermal cells oblong to linear in outline. (Figures 13, 14)

Other specimen examined. WESTERN AUSTRALIA: 300 m S on railway access track from York–Greenhills/Quairading Rd, 9 Apr. 2008, *R.L. Barrett & M. Wallace* RLB 4475 (PERTH; duplicates to be distributed).

Distribution and habitat. As currently broadly defined, scattered between York and Perenjori in south-west Western Australia, usually associated with granite outcrops, though these may be subsurface (Figure 6d).

Phenology. Flowering recorded for April and May.

Conservation status. As currently defined, widespread and not threatened. Specimens matching the type are only known from the vicinity of York and this form may possibly be threatened.

Etymology. From the Latin *costa* (rib, side), perhaps in reference to the fine striations on the culms, particularly evident on some of the dead leaves on the type specimen.

Figure 13. Lectotype of *Lepidosperma costale* (*Preiss* 1798; LD). Scale bar = 5 cm.

Figure 14. Lectotype of *Lepidosperma costale*. A – inflorescence; B – spikelet; C – leaf face; D – culm face (*Preiss* 1798; LD). Scale bars: A = 1 cm; B–D = 2 mm.

Notes. *Lepidosperma costale* appears to be a tetraploid lineage, with no diploids so far located in the vicinity of the type locality. Occasional allotetraploid hybrid plants have been found in mixed populations with tetraploid plants (M. Wallace pers. comm.).

The other syntype, *Plantae Preissianae* No. 1799, is a more robust specimen (re-sprouting after fire), but all the spikelets are infected by a smut fungus or are immature, so it is not suitable as a lectotype. The culms (to 2.24 mm wide) and leaves (to 1.78 mm wide) are much larger, compressed-hexagonal in cross-section, and the sheaths are darker and more fibrous. A recent collection has been made from the same location (*R.L. Barrett & G. Messina* RLB 3373, PERTH; duplicates to be distributed).

Lepidosperma fimbriatum Nees, in Lehm., *Pl. Preiss.* 2(1): 91 (1846). *Lectotype*, *fide* R.L. Barrett & K.L. Wilson, *Austral. Syst. Bot.* 25: 245 (2012): 'In regionibus interioribus Australiae meridionali-occidentalis' [Interior regions of southern Western Australia, possibly near Cape Riche], Nov. 1840, *L. Preiss* [*Pl. Preissianae* No. 1793] (*lectotype*: LD; *isolectotype*: MEL 2295080).

This description is based on the lectotype sheet at LD only.

Tufted perennial with spreading rhizomes. *Culms* and *leaves* distichous; leaf to culm length ratio 0.7–1.1:1; angle of fan (ramet) spread 10–15°. *Leaves* rigid, equitant, erect, ±flat to slightly convex on one face, finely striate, yellow-green, not glaucous, with 18–34 stomatal rows per face (2 rows per groove), 18.5–25.5 cm tall, 1.9–3.5 mm wide, 0.32–0.45 mm thick; margins yellow-green, with a continuous band of short, white hairs and often coated in reddish orange resin; sheath yellow to pale brown, glabrous, the base almost entire to somewhat fibrous, with small amounts of yellow resin. *Culms* as for leaves but less prominently striate, with 26–38 stomatal rows per face, 25–38.5 cm tall, 2.6–3.4 mm wide, 0.72–0.79 mm thick. *Inflorescence* immature, ovate-lanceolate in outline, 33–43 mm long, 5–7 mm wide, with few lateral branches, 1 lateral branch per node; basal lateral branch 17 mm long with *c*. 6 spikelets; involucral bract 58–72 mm long, leaf-like. Other inflorescence features too immature to measure. (Figures 15, 16)

Selected specimens examined. WESTERN AUSTRALIA: Ravensthorpe Range, 2.1 km SE of Mt McMahon, 11 May 2007, *G.F. Craig* 8245 (PERTH); Neredup Nature Reserve 32784, 1 km NE along Muntz Rd from intersection with Bebenorin Rd, E of Esperance, 2 Sep. 2001, *E. Hickman & S. Gilfillan* EJH 1180 (PERTH); on N side of Newdegate–Ravensthorpe Rd, 1.1 km W of Lake King townsite, Damnosa Nature Reserve (Res. 24435) [Plot - LK20], 14 May 1999, *G.J. Keighery & N. Gibson* 5477 (PERTH); Ravensthorpe Range, survey site R109, 34.3 km ESE of Ravensthorpe. Located on E slope of Bandalup Hill, below *Eucalyptus purpurata* conservation zone, *c*. 30 m NW of track, 29 May 2007, *S. Kern, R. Jasper & D. Brassington* LCH 17175 (PERTH); 5.2 km WNW of Kybulup Pool, West River, 27 Oct. 1986, *K.R. Newbey* 11316 (PERTH).

Distribution and habitat. Only known from the Ravensthorpe region and a single collection from east of Esperance, growing in rocky soils in kwongan heath or low mallee woodland (Figure 6e).

Phenology. Flowers collected in May.

Conservation status. Locally common, not threatened. Occurs in Fitzgerald River National Park.

Etymology. The specific epithet is derived from the Latin *fimbriatus* (fringed) in reference to the prominent hairs on the margins of the culms and leaves.

Figure 15. Lectotype of *Lepidosperma fimbriatum* (*Preiss* 1793; LD). Scale bar = 5 cm.

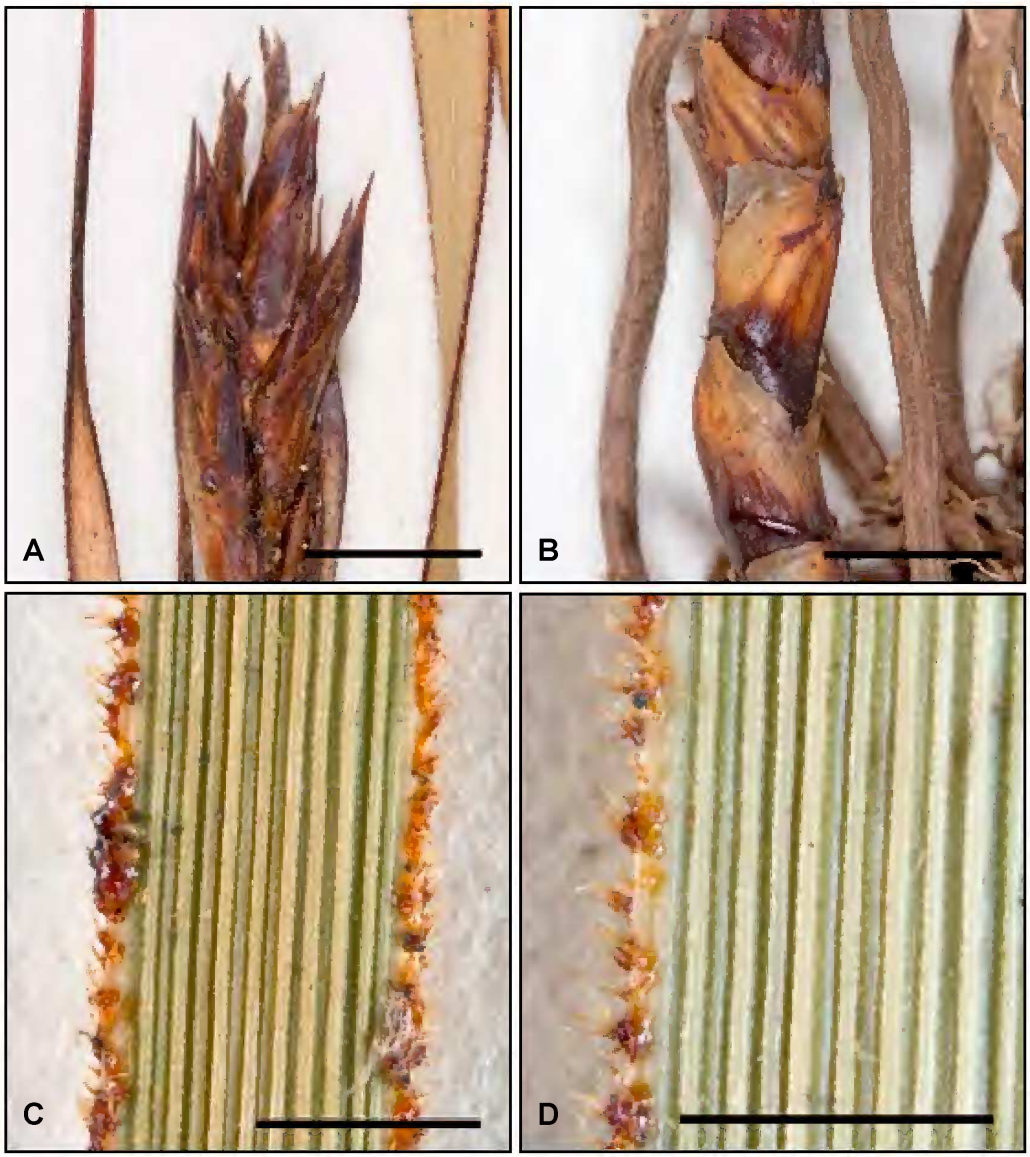

Figure 16. Lectotype of *Lepidosperma fimbriatum*. A – inflorescence (immature); B – rhizome; C – leaf face; D – leaf margin with resin-coated hairs (*Preiss* 1793; LD). Scale bars: A, B = 5 mm; C, D = 2 mm.

Notes. Somewhat similar in appearance to *L. diurnum* R.L.Barrett due to the prominent hairs on the culm margins, differing in the compact habit of the plants with very short inflorescences. This name has only recently been applied owing to a lack of knowledge of its correct application and the fact that the species was not recollected until 1986.

Lepidosperma humile (Nees) Boeck., *Linnaea* 38: 324 (1874). *Lepidosperma lineare* var. *humile* Nees, in Lehm., *Pl. Preiss.* 2(1): 90 (1846). *Type*: 'In regionibus interioribus Australiae meridionali-occidentalis' [In interior regions of south-western Australia, possibly near Cape Riche], Nov. 1840, *L. Preiss* [*Pl. Preissianae* No. 1810] (*holotype*: LD 1240044; *isotype*: G).

This description is based on the holotype sheet at LD only.

Tufted perennial with short rhizomes. *Culms* and *leaves* distichous; leaf to culm length ratio 0.5–1.1:1; angle of fan (ramet) spread 20–25°. *Leaves* rigid, equitant, erect, ±flat to slightly biconvex, finely striate, yellow-green, not glaucous, with 20–22 stomatal rows per face, 7.0–17.5 cm tall, 0.82–1.42 mm wide, 0.35–0.38 mm thick; margins yellowish, with an almost continuous band of short, white, incurved hairs or scabrid projections which are mostly obtuse and in small clusters, sometimes the margins covered with yellow resin; sheath yellow to pale brown, glabrous, the base not or scarcely fibrous, with small amounts of orange to red resin. *Culms* as for leaves with 16–18 stomatal rows per face, 13.5–15.5 cm tall, 1.17–1.32 mm wide, 0.43–0.48 mm thick. *Inflorescence* lanceolate in outline, 37–42 mm long, 8.0–9.8 mm wide, with few lateral branches, 1 lateral branch per node; basal lateral branch 19.0–20.3 mm long with 9–10 spikelets; involucral bract 18–23.5 mm long. *Spikelets* 3.9–4.8 mm long, the upper flower bisexual, the lower flower functionally male. *Glumes* 6, with narrow, opaque, pale margins grading to a reddish brown keel, the surface evenly covered with short curly hairs, the apex acuminate; sterile glumes 4; fertile glumes *c.* 3.6 mm long, *c.* 1.1 mm wide. *Stamens* 3; anthers *c.* 1.5 mm long including the apical appendage, *c.* 0.19 mm wide; filaments not seen. *Style* 3-fid, unbranched portion *c.* 1.4 mm long, branches *c.* 0.85 mm long; no nuts developed. (Figures 17, 18)

Selected specimens examined. WESTERN AUSTRALIA: 5 km S of Grass Patch at rest area, 13 July 2005, *R.L. Barrett* RLB 2746 (PERTH); Environmental Impact Assessment Site No. 5, Shoemaker Levy Ore body, Ravensthorpe Nickel Operations mine tenement, *c.* 30 km E of Ravensthorpe, 2005, *N. Evelegh* 10804 (PERTH); Melaleuca swamp, 8 km NE of Ongerup, 1.1 km NE of intersection of North Ongerup Rd and Magners Rd on NE side of wetland. SAP wetlands site SPS091C, 19 Oct. 1999, *M.N. Lyons & S.D. Lyons* 4361 (PERTH); Corackerup Nature Reserve, Q58 W of Normans Rd adjacent central firebreak, 14 Apr. 2003, *E.M. Sandiford* EMS 703 (PERTH).

Distribution and habitat. Scattered around Ravensthorpe, west to Corackerup Nature Reserve near Jerramungup, in south-west Western Australia, growing in low mallee woodland or kwongan heath, usually on rocky loam (Figure 6f).

Phenology. Flowers collected in May.

Conservation status. Locally common and not threatened.

Etymology. The specific epithet is derived from the Latin *humilis* (small, diminutive, low) and refers to the small stature of the plant relative to other species of this genus.

Figure 17. Holotype of *Lepidosperma humile* (*Preiss* 1810; LD 1240044). Scale bar = 5 cm.

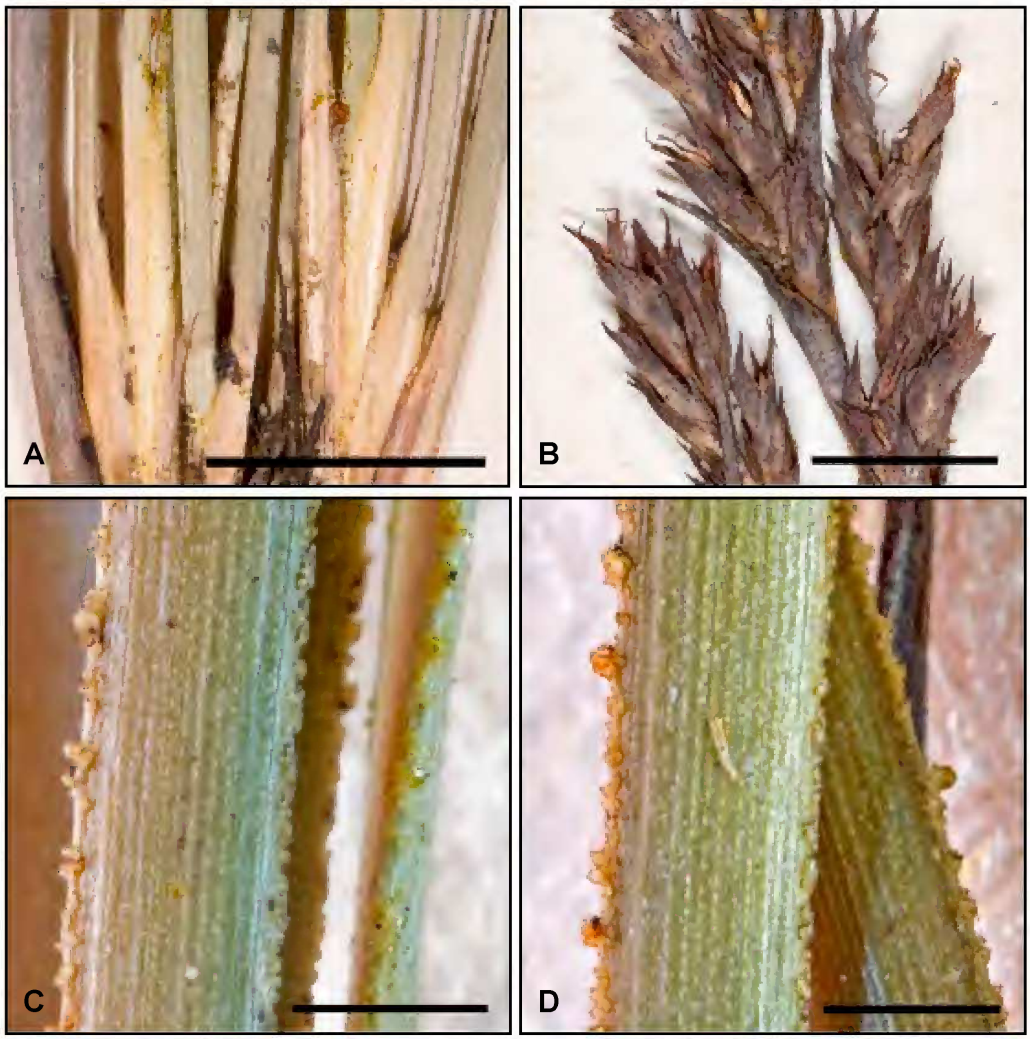

Figure 18. Holotype of *Lepidosperma humile*. A – ramet base; B – inflorescence; C – culm face; D – culm face (*Preiss* 1810; LD 1240044). Scale bars: A, B = 1 cm; C, D = 1 mm.

Notes. Somewhat similar in appearance to a number of unnamed taxa; distinctive in the combination of scabrous projections and short, white hairs on the margins of the culms and leaves and the small stature of the plants. This name has only recently been applied owing to a lack of knowledge of the correct application of the name and the fact that the species was not recollected until 1999.

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